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TITLE: BATH WATER CLEANING DEVICE
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APPL-NO: JP09344903**APPL-DATE:** December 15, 1997**INT-CL (IPC):** C02F003/06 , B01D035/027**ABSTRACT:**

PROBLEM TO BE SOLVED: To prevent bacterium contamination by the biofilms formed within a circulation circuit including the bathtub of a bath water cleaning device.

SOLUTION: When the biofilms are formed on the inside wall of the circulation circuit 20, the forming state of the biofilms is detected by a biofilm detecting means 28 and detected information is transmitted by an alarm means 29. Since the detected information is displayed on the alarm means 29, a user is able to easily recognize that the biofilms are formed in the bathtub 19 and the circulation circuit 20. The bathing in the bathtub 19 contaminated with bacteria may be averted by making remedy for cleaning of the bathtub 19 and the circulation circuit 20, replacing of the bath water, etc.

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CLAIMS

[Claim(s)]

[Claim 1] The **** purge prepared the circulation circuit containing a bathtub, a circulation means it is prepared in the aforementioned circulation circuit and circulate through ****, a physical purification means remove the suspended solid which is prepared in the aforementioned circulation circuit and contained in ****, a biotechnology film detection means detect the biotechnology film formed in the aforementioned circulation circuit of bacterial propagation, and an information means report the detection result of a biotechnology film.

[Claim 2] A biotechnology film detection means is the **** purge according to claim 1 considered as the composition which has the luminescence section prepared in the circulation circuit wall, and the light-receiving section which is prepared in a circulation circuit wall and receives the light from the aforementioned luminescence section, and detects a biotechnology film based on the magnitude of attenuation of the light in the aforementioned light-receiving section.

[Claim 3] The claim 1 which established the biotechnology film detection means between the bathtub and the suction side of a circulation means, or a **** purge given in dyadic.

[Claim 4] The constituted claim 1 whose predetermined-time circulation of high temperature hot water is attained by the heating means which was equipped with the by-path pipe which bypasses a bathtub, enabled formation of a closed circulation circuit with the passage change means, and was established in the aforementioned close circulation circuit based on the biotechnology film detection result, or the **** purge of three given in any 1 term.

[Claim 5] The **** purge according to claim 4 considered as the composition drained outside after equipping the circulation circuit with the drainage means of elevated-temperature circulating water and circulating predetermined-time high temperature hot water in a closed circulation circuit.

[Claim 6] A drainage means is the **** purge of the claim 4 or 5 term publication considered as the composition which usually lets flow the suspended solid deposited on the filtering medium of a purification means from an opposite direction to the filtration direction, and is discharged outside.

[Claim 7] The claim 1 considered as the composition drained outside while it has the hot-water supply means which can supply high temperature hot water in a circulation circuit and predetermined-time supply of the high temperature hot water is carried out into a circulation circuit based on a biotechnology film detection result, or the **** purge of six given in any 1 term.

[Claim 8] The claim 4 considered as the composition which is equipped with a timer means to set up a bathing setup-time band, performs detection operation of a biotechnology film in addition to a bathing setup-time band, and carries out elevated-temperature circulation of the inside of a closed circulation circuit by the heating means, or lets high temperature hot water flow to a circulation circuit by the hot-water supply means, or the **** purge of seven given in any 1 term.

[Claim 9] The claim 1 considered as the composition which establishes a washing medium supply means to mix the washing medium for washing the inside of a bathtub and a circulation circuit in circulating water, supplies a washing medium based on the detection result of a biotechnology film, and performs circulation purification operation, and the water in a bathtub drains outside after that, or the **** purge of eight given in any 1 term.

[Claim 10] The **** purge according to claim 9 considered as the composition which will supply a washing medium, and will perform circulation purification operation, and the water in a bathtub will drain outside after that if the number-of-times Records Department of detection is established in a biotechnology film detection means and the number of times of biotechnology film detection becomes more than the number of times of predetermined.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates the suspended solid contained in water about removal purification technology to the **** purge which purifies bath water especially as business use or home use.

[0002]

[Description of the Prior Art] As shown in drawing 5, in case a filter is washed as this conventional kind of a **** purge with the filter of the purge using the organic substance disintegration of a microorganism, and the filter washing function washed using ****, the thing equipped with the hot water flare function in which only a predetermined flow rate carries out teeming of some hot-water supply water is in a bathtub so that **** may not decrease (for example, JP,7-39905,U).

[0003] In this drawing, 1 is a heat source for baths which heats the water to which **** was supplied from keeping warm of the feed pipe 2, and carries out teeming to a bathtub 3, and has the heat exchanger 4 for baths, and a burner 5. 6 and 7 are the circulation system which circulates through the warm water in a bathtub 3, and a filter which purifies ****, respectively, and are prepared in the bath circulation path 8 containing the heat exchanger 4 for baths. 9 and 10 are the cross valves prepared in the outlet side the entrance side of a filter 7, respectively, and bath water purification and washing of a filter 7 are possible by changing the water flow direction of a filter 7. Moreover, 11 is a drain pipe which drains the washing drainage which washed the filter 7, and is connected to the cross valve 9 prepared in the entrance side of a filter. 12 is the hot-water pipe connected to the heat source for baths, and the hot-water supply plug 13 is connected at the nose of cam. 14 is the hot water flare pipe which connected the bath circulation path 8 and hot-water pipe 12 of a downstream of a cross valve 10, and the check valve 15 and the solenoid valve 16 are formed. 17 is the amount detection sensor of water flow which detects the flow rate which it is prepared in the bath circulation path 8, and carries out the regurgitation to a bathtub 3.

[0004] In this composition, if a circulation system 6 is operated, **** will circulate, and while disassembling ammonia, protein, etc. which are contained in **** by passing the filter 7 with which the microorganism bred from the lower part side to the upper part side, by the heat exchanger 4 for baths, it is heated by constant temperature and returned to a bathtub 3.

[0005] Moreover, if passage is changed by the cross valve prepared in the outlet side the entrance side of a filter 7 and a circulation system 6 is operated in case a filter 7 is washed, **** will flow from the upper part side of a filter 7 to a lower part side, and the dirt which had adhered in the filter 7 will begin to be poured to the drain pipe 11 shell exterior.

[0006] Moreover, in order to prevent that the hot water of a bathtub 3 decreases in number after this, teeming was performed for the hot water generated in the heat source 1 for baths in the bathtub 3 through the hot water flare pipe 13 and the bath circulation path 8.

[0007]

[Problem(s) to be Solved by the Invention] That is, by the above-mentioned conventional **** purification system, in order to perform purification by the enzyme activity of a microorganism, the purification performance was secured by breeding a microorganism to the microorganism support in a filter, and forming a biological slime (biotechnology film). For this reason, the biological slime was formed also in the circulation circuit. However, in a biological slime's supplying a nutrition to a bacteria group, and promoting proliferation, or protecting a bacteria group from germicidal actions, such as a germicide, and becoming the so-called hotbed of a bacteria group, the amoeba which is protozoa tends to inhabit a biological slime, this amoeba serves as a host of the legionella bacteria which is a disease germ of register ONERA pneumonia, and legionella bacteria increases it. Consequently, the technical problem that a bathtub and a circulation circuit were polluted bacteriologically occurred.

[0008]

[Means for Solving the Problem] A circulation means it is prepared in the circulation circuit containing a bathtub and a circulation circuit, and circulate through water in order that this invention may solve the above-mentioned technical problem, a physical purification means remove the suspended solid which is prepared in a circulation circuit and contained in ****, a biotechnology film detection means detect the biotechnology film formed in a circulation circuit of bacterial propagation, and an information means report the detection result of a biotechnology film prepare.

[0009] According to the above-mentioned invention, since the biotechnology film formation state in a circulation circuit is detected and reported by the biotechnology film detection means, a user can know the pollution degree in the circulation circuit by bacteria, and can avoid the use of **** by which contamination was carried out by taking cures, such as exchange of water. Moreover, exchange of unnecessary **** is lost and **** can be used effectively.

[0010]

[Embodiments of the Invention] The **** purge concerning the claim 1 of this invention has the circulation circuit containing a bathtub, a circulation means it is prepared in a circulation circuit and circulate through ****, a physical purification means filter physically the suspended solid which is prepared in a circulation circuit and contained in ****, a biotechnology film detection means detect the biotechnology film formed in a circulation circuit of bacterial propagation, and an information means report the detection result of a biotechnology film.

[0011] And since the biotechnology film formation state in a circulation circuit is detected and reported by the biotechnology film detection means, a user can know the contamination degree in a circulation circuit, and can avoid bathing to **** by which contamination was carried out by taking cures, such as exchange of ****.

[0012] A biotechnology film detection means has the luminescence section prepared in the circulation circuit wall, and the light-receiving section which receives the light from the luminescence section, and considers the **** purge concerning the claim 2 of this invention as the composition which detects a biotechnology film based on the magnitude of attenuation of the light in the light-receiving section.

[0013] And if a biotechnology film is formed in a circulation circuit wall, the light income in the light-receiving section will fall to the luminescence energy from the luminescence section. That is, an equivalence biotechnology film formation state is detected by detecting and analyzing the magnitude of attenuation of light. Therefore, it can measure simple, without measurement taking time.

[0014] The **** purge concerning the claim 3 of this invention establishes a biotechnology film detection means between a bathtub and the suction side of a circulation means.

[0015] And if purification circulation operation is performed for a long period of time, in the suction side of the circulation circuit connected to the bathtub, a suspended solid will precipitate and accumulate slightly. This suspended solid to deposit supplies a nutrition to a bacteria group, and promotes proliferation. For this reason, formation of a biotechnology film comes to advance from the suction side of the circulation circuit connected to the bathtub. However, since the biotechnology film detection means is established between the bathtub and the suction side of a circulation means, corresponding to formation of an early biotechnology film, it becomes detectable [the biotechnology film in a circulation circuit]. Therefore, before the whole inside of a circulation circuit is covered with a biotechnology film, it becomes possible to notify a user.

[0016] The **** purge concerning the claim 4 of this invention has the by-path pipe which bypasses a bathtub, and enables formation of a closed circulation circuit with a passage change means, and the heating means established in the closed circulation circuit based on the biotechnology film detection result constitutes it possible [predetermined-time circulation of high temperature hot water].

[0017] And by the biotechnology film detection means, when a biotechnology film is detected, a closed circulation circuit is constituted by the passage change means, and the water in a closed circulation circuit is heated by the elevated temperature (for example, 70 degrees C) by the heating means, and carries out predetermined-time circulation. Consequently, while the biotechnology film formed in the closed circulation circuit exfoliates with the heat energy of elevated-temperature circulating water, the bacteria containing the disease germ which is beginning to breed in a biotechnology film becomes extinct with heat. For this reason, the contamination in a closed circulation circuit can be prevented.

[0018] After the **** purge concerning the claim 5 of this invention has the drainage means of elevated-temperature circulating water in a circulation circuit and circulates predetermined-time high temperature hot water in a closed circulation circuit, it is considered as the composition drained outside.

[0019] And the cadaver of the bacteria containing the fragment and disease germ of a biotechnology film was contained in the high temperature hot water through which it circulated, and the suspended solid has increased very much. However, by discharging outside with a drainage means, even if it performs purification operation again, it is not returned to a bathtub. For this reason, not to mention **** becoming muddy, the organic substance used as the nutrient of the bacteria as the whole bath drainage system can be decreased, and bacterial propagation can be reduced.

[0020] The **** purge concerning the claim 6 of this invention is considered as the composition which usually lets flow the suspended solid deposited on the filtering medium of a purification means as a drainage means from an opposite direction to the filtration direction, and is discharged outside.

[0021] And since it backwashes by high temperature hot water while being able to aim at effective use of ****, since filtering-medium washing of a purification means is performed using the high temperature hot water after elevated-temperature circulation, the blinding of a purification means is prevented effectively and can maintain good decontamination capacity over a long period of time.

[0022] The **** purge concerning the claim 7 of this invention has the hot-water supply means which can supply high temperature hot water in a circulation circuit, and it considers it as the composition drained outside, carrying out predetermined-time supply of the high temperature hot water into a circulation circuit based on a biotechnology film detection result.

[0023] And if a biotechnology film is detected by the biotechnology film detection means, predetermined-time supply of the high temperature hot water will be carried out by the hot-water supply means in a circulation circuit. Consequently, while the biotechnology film formed in the circulation circuit exfoliates with the heat energy of high temperature hot water, the bacteria containing the disease germ which is beginning to breed in a biotechnology film becomes extinct with heat, and is discarded by the drainage means shell exterior. For this reason, while being able to prevent the contamination in a circulation circuit, high temperature hot water is obtained by the hot-water supply means for a short time.

[0024] The **** purge concerning the claim 8 of this invention has a timer means to set up a bathing setup-time band, performs detection operation of a biotechnology film in addition to a bathing setup-time band, and considers it as the composition which carries out elevated-temperature circulation of the inside of a closed circulation circuit by the heating means, or lets high temperature hot water flow to a circulation circuit by the hot-water supply means.

[0025] And when a biotechnology film is detected in addition to a bathing time zone and a biotechnology film is detected, in order to come to perform operation which stops purification operation and lets high temperature hot water flow for the inside of a closed circulation circuit in a circulation circuit by elevated-temperature circulation or the hot-water supply means with a heating means, it becomes that a bathing time zone can always perform bath water purification operation, and clear **** is secured within a bathing time zone always.

[0026] The **** purge concerning the claim 9 of this invention has a washing medium supply means to mix the washing medium for washing the inside of a bathtub and a circulation circuit in circulating water, supplies a washing medium based on the detection result of a biotechnology film, performs circulation purification operation, and considers it as the composition which drains the water in a bathtub outside after that.

[0027] And a physical washing medium is supplied chemically [a bathtub cleaning agent etc.] from a washing medium supply means, and the inside of a purification circulation circuit including a predetermined-time bathtub and a purification means is washed. While being able to save the time and effort which cleans a bathtub artificially by this, the biotechnology film generated by the purification circulation circuit can be removed, and the contamination of ****, i.e., the bacterial infection to a human body, can be prevented.

[0028] The **** purge concerning the claim 10 of this invention will be considered as the composition which supplies a washing medium, and performs circulation purification operation, and the water in a bathtub drains outside after that, if it has the number-of-times Records Department of detection for a biotechnology film detection means and the number of times of biotechnology film detection becomes more than the number of times of predetermined.

[0029] And if washing and sterilization of a circulation circuit by the elevated temperature will be performed if the number of times of biotechnology film detection is less than the number of times of predetermined, and the number of times of detection of a biotechnology film detection means turns into the number of times of predetermined, it will come to perform washing by washing media, such as a bathtub cleaning agent. Therefore, it is compatible with the **** contamination prevention by washing and sterilization of a circulation circuit, i.e., the bacterial infection prevention to a human body, in water saving by the number-of-times reduction of washing using the cleaning agent.

[0030]

[Example] (Example 1) The example of this invention is hereafter explained using a drawing. Drawing 1 is the ** type block diagram of the **** purge of the example 1 of this invention, and drawing 2 is the ** type block diagram of a biotechnology film detection means. In drawing 1, the circulating pump which is a circulation means by which 18 circulates through the water in a bathtub 19, and 20 are circulation circuits. 21 is the filtration means prepared in the circulation circuit of the discharge side of a circulating pump, and has filter bed 21b which supports granular filtering-medium 21a with which the interior was filled up, and granular filtering-medium 21a.

[0031] Moreover, 22 is the condensation means prepared in the upstream of granular filtering-medium 21a within the filtration means 21, and consists of cathode 22b which consists of positive electrode 22a and stainless steel which consist of aluminum, and constant-current-power-supply 22c which energizes inter-electrode.

[0032] 23 is a heating means for it to be prepared in the circulation circuit 20 and to perform the temperature control of *** through which it circulates, and consists of heater 23a and thermistor 23b which detects the water temperature in a circulation circuit. 24 is the drainage means prepared in the circulation circuit 20 between the downstream of the filtration means 21, and a bathtub, and has drain pipe 24a and drain-valve 24b.

[0033] Moreover, 25 is the cross valve prepared in the circulation circuit between the drainage means 24 and a bathtub, and 26 is the cross valve prepared in the circulation circuit between the heating means 23 and a bathtub 19. Further 27 is a by-path pipe which bypasses a bathtub 19, and constitutes a closed circulation circuit from a cross valve 25, a by-path pipe 27, a cross valve 26, a heating means 23, a circulating pump 18, and a filtration means 21.

[0034] Moreover, 28 is the biotechnology film detection means prepared in the circulation circuit 20 between a cross valve 26 and the heating means 23. As shown in drawing 2, the biotechnology film detection means 28 is formed in the periphery of the circulation circuit where luminescence section 28a which has Light Emitting Diode (diode), and light-receiving section 28b which has a photosensor for receiving the light which emitted light have translucent part 28c. Moreover, the signal of the transmitted light is received in light-receiving section 28b, and Records Department 28e which records 28d of judgment sections which judge the formation state of a biotechnology film from the attenuation state, and the number of times which detected the biotechnology film is prepared. 29 is an information means to report detection of a biotechnology film to a user in response to the signal from the biotechnology film detection means 28.

[0035] 30 is prepared between bathtubs 19 the suction side of a circulating pump 18, it is a washing medium supply means to supply washing medium 30a which becomes circulating water from chemical cleaning agents, such as a surfactant, and the amount of mixing is controlled by opening-and-closing valve 30b.

[0036] Further 31 is a timer means and 32 is each part and a controller which manages control of each means.

[0037] Next, operation of this example and an operation are explained. It circulates, as a circulating pump 18 operates during the bathing time zone set as the bathtub 19 by the timer means 31 after the hot water flare and **** showed by the solid line arrow of

drawing 1, and **** corrupted by the bathing action passes the filtration means 21, and is purified. The condensation means 22 is operated by the controller 32 at the predetermined stage of purification operation. That is, the seal of approval of the voltage is carried out to positive electrode 22a by constant-current-power-supply 22c among cathode 22b, and aluminum ion is eluted from positive electrode 22a by electrolysis. This aluminum ion reacts with water and the colloid of an aluminum hydroxide is formed. Since suspended solids, such as sebum, dirt, and a bacteria group, have a carboxyl group in the side chain, they have been charged in negative here. On the other hand, for a positive charge, an aluminum hydroxide serves as a binding medium, adsorbs a detailed suspended solid by bridge formation operation, an aluminum hydroxide is made to major-diameter-size, and the so-called condensation flocks are generated. Consequently, condensation flocks are effectively filtered by the depths section of filtering-medium 21a, and purification in a short time is attained. When it filtered according to the experiment, energizing 300mA of purified water of two turbidity to inter-electrode, 0.5 or less degrees was obtained after 20-minute progress. That is, in this example, even when a user takes a bath continuously (for example, 30-minute interval), a bath can be taken to clear ****. Moreover, a fall of the water temperature of **** maintains the temperature which the heating means 23 was started and was suitable for bathing.

[0038] On the other hand, the dirt which adhered to the human body by bathing, and a bacteria group are carried into ****, and since **** serves as suitable temperature environment for proliferation of a bacteria group while containing abundantly the matter used as the nutrient of bacteria groups, such as amino acid and protein, the carried-in bacteria group is actively increased in a bathtub and the circulation circuit 20. Consequently, with progress of bathing days, even if **** is visually clear, it will be gradually polluted with circulation circuit 20 internal surface or the wall surface of a bathtub 19 bacteriologically, and a biotechnology film comes to be formed. According to our check experiment, on circulation circuit 20 wall surface, it is checking that apply to the discharge side of a circulating pump 18 from the suction side of a circulating pump 18, and a biotechnology film is formed with time. At this example, since the biotechnology film detection means 28 established between bathtubs 19 the suction side of a circulating pump 18 is established, before a biotechnology film is formed in the circulation circuit 19 whole, the light sent from luminescence section 28a comes to judge formation of a biotechnology film by judgment section 28c by the magnitude of attenuation of the light received by light-receiving section 28b. That is, it comes to be reported from the information means 29 to a user at the outside of the bathing time zone set up by the timer means 31. A cross valve 25 and a cross valve 26 are changed so that it can furthermore come, simultaneously closed circulation circuitry may be carried out with a cross valve 25, a by-path pipe 27, a cross valve 26, the heating means 23, a circulating pump 18, and the filtration means 21, and a circulating pump 18 and the heating means 23 are operated so that the water in a close circulation circuit may circulate more than for 3 minutes at 70 degrees C, as the dashed line arrow of drawing 1 shows. Thus, while the biotechnology film formed in the circulation circuit by making it operate exfoliates from circulation circuit 19 wall, a bacteria comes to be annihilated completely. Then, if a cross valve 26 changes so that a bathtub 19 and a circulating pump 18 may be open for free passage, drain-valve 24b of the drainage means 24 is opened and a circulating pump 19 is operated again, the biotechnology film which exfoliated in the circulation circuit 19 will come to be discharged outside. Consequently, a biotechnology film is removed, the attenuation factor of light also recovers luminescence section 28a of a biotechnology film detection means, and the light-receiving section 28b circumference, biotechnology film detection with the information means 29 is canceled, and the number of times of biotechnology film detection is recorded on 28d of number-of-times Records Department of detection. Furthermore, if a detection recording rate exceeds a predetermined value by long-term operation, it will be mixed in circulating water of the circulation circuit 20 through opening-and-closing valve 30b by which chemical washing medium 30a which contains a surfactant, a sodium bicarbonate, etc., by the washing medium supply means 30 was opened, and the inside of the circulation circuit 20 which includes bathtub 19 wall and the filtration means 21 by circulation operation will be washed. **** after washing is compulsorily discarded outside by the drainage means 24.

[0039] As mentioned above, there are the following effects in this example.

(1) By the biotechnology film detection means, since the formation state of the biotechnology film in a circulation circuit is reported, a user can know a contamination degree easily and can avoid bathing to **** by which contamination was carried out by taking cures, such as exchange of ****.

[0040] (2) Exchange of unnecessary **** is lost and **** can be used effectively.

(3) By establishing a biotechnology film detection means between the bathtub which a biotechnology film tends to form, and the suction side of a circulation means, detection of early biotechnology film formation is possible.

[0041] (4) Since the inside of a closed circulation circuit circulates at a predetermined-time elevated temperature by the heating means, while a biotechnology film exfoliates, it can become extinct with heat about the bacteria containing a disease germ.

[0042] (5) Since it circulates through predetermined-time high temperature hot water and drains outside, the organic substance used as the nutrient of the bacteria as the whole circulatory system decreases in number, and propagation can be reduced.

[0043] (6) By timer means to set up a bathing setup-time band, since detection of a biotechnology film and elevated-temperature circulation operation accompanying this are performed at the outside of a bathing time zone, in a bathing time zone, bath water purification can always be performed and clear **** can be secured at any time.

[0044] (7) If washing and sterilization of a circulation circuit by the elevated temperature will be performed if the number of times of biotechnology film detection is below the number of times of predetermined, and it becomes more than the number of times of predetermined, since a washing medium will be supplied and washing operation of a circulation circuit will be performed, it is compatible in water saving by the number-of-times reduction of washing using the cleaning agent with **** contamination prevention (bacterial infection prevention to = human body).

[0045] (8) An aluminum hydroxide is generated with a condensation means, and in order to adsorb a detailed suspended solid and to make it major-diameter-size, it can filter effectively with a filtering-medium means. That is, purification in a short time is attained.

[0046] (Example 2) Drawing 3 shows the block diagram of the **** purge in the example 2 of this invention. In this drawing, the by-path pipe with which 33 bypasses the filtration means 21, and 34 are the cross valves which can be changed to the drain pipe 35 which is prepared in the upper part side of the filtration means 21, and is open for free passage to the discharge side or the exterior of a circulating pump 18. Moreover, 36 is prepared in the lower part side of the filtration means 21, and is the cross valve which can be changed to an outflow-in bathtub 19 side, or a by-path pipe 33. And when a cross valve 34 is opened for free passage by the discharge side of a circulating pump 18, as a cross valve 36 is open for free passage to an outflow-in bathtub 19 side, when a cross valve 34 is opened for free passage by the drain pipe 35, a cross valve 36 is changed so that a by-path pipe 33 may be open for free passage, and is constituted as a back wash means which can wash the filtration means 21. Further 37 is each part and a controller which manages control of each means. In addition, the thing of the same sign as an example 1 has the same structure, and explanation is omitted.

[0047] Next, operation and an operation of this example are explained. If a biotechnology film begins to be gradually formed in the circulation circuit 19, a biotechnology film will be detected by the biotechnology film detection means 28, and it will be reported from the information means 29 to a user. The inside of a closed circulation circuit circulates at an elevated temperature. Therefore, while the biotechnology film formed in the circulation circuit exfoliates from circulation circuit 19 wall, a bacteria becomes extinct completely. Then, a cross valve 26 changes a bathtub 19, a heating means, and 23 so that a free passage and a cross valve 34 may open a drain pipe 35 and the filtration means 21 for free passage and a free passage and a cross valve 36 may open circulating-pump 18 discharge side and the filtration means 21 for free passage, and a circulating pump 19 is operated. Consequently, as the solid line arrow of drawing 2 shows, the exfoliative biotechnology film is discarded outside from an exhaust pipe 35 through a by-path pipe 33 with circulating water which flows from an opposite direction in the filtration means 23 to the usual filtration direction. Furthermore, at this time, since the suspended solid deposited in the filtration means 21 is discharged outside by the wash water, the inside of the filtration means 21 comes to be washed. About its operation and operation, it is the same as that of an example 1, and omits.

[0048] As mentioned above, there are the following effects in this example.

(1) The high temperature hot water which carried out elevated-temperature circulation is not discarded as it is, but since it uses for washing of a filtration means, the quantity of hot water in the bathtub discarded as a wash water can be reduced.

[0049] (2) In order to wash a filtration means by the high temperature hot water which carried out elevated-temperature circulation, the cleaning effect within the filtration means by high temperature hot water improves.

[0050] (Example 3) Drawing 4 shows the block diagram of the **** purge in the example 3 of this invention. this drawing .. setting -- 38 circulation circuits 19 -- and it is alike, and it is the hot-water supply means which can supply high temperature hot water or warm water to a bathtub 19, and connects with the by-path pipe 27 39 is the drainage means connected to the circulation circuit 20 between the filtration means 21 and a circulating pump, and consists of drain-valve 39a and drain pipe 39b. Further 40 is each part and a controller which manages control of each means. In addition, the thing of the same sign as an example 1 has the same structure, and explanation is omitted.

[0051] Next, operation and an operation of this example are explained. If a biotechnology film begins to be gradually formed in the circulation circuit 19, a biotechnology film will be detected by the biotechnology film detection means 28, and it will be reported from the information means 29 to a user. A cross valve 25 exfoliates with this the biotechnology film to which it was generated by circulation means 21 wall and they had adhered [a / drain-valve 40/ a free passage and] the by-path pipe 27 and the heating means 23 in the by-path pipe 27 and filtration means 21 lower-part side when the free passage and the cross valve 26 supplied high temperature hot water in the state of open, as shown in the solid line arrow of drawing 3 from the hot-water supply means 38, and it discards outside, heat-sterilizing a bacteria.

[0052] Moreover, it is discarded by the ecrcis means 39 shell exterior with the elevated-temperature hot-water supply water which can come, simultaneously flows from an opposite direction in the filtration means 23 to the usual filtration direction within the filtration means 21. Therefore, the inside of the filtration means 21 is washed. Moreover, after performing elevated-temperature circulation operation, high temperature hot water can also be supplied and washed with the hot-water supply means 38.

[0053] As mentioned above, there are the following effects in this example.

(1) Since the inside of the circulation circuit 20 and the filtration means 21 is washed using the high temperature hot water supplied from a hot-water supply machine, the filtration means 21 and the circulation circuit 20's can be performed certainly.

[0054] (2) Making it circulate with a heating means, in order for a hot-water supply machine to generate high temperature hot water, removal of a biotechnology film can be performed for a short time rather than it creates high temperature hot water.

[0055]

[Effect of the Invention] Since the **** purge concerning the claim 1 of this invention is detected by the biotechnology film detection means and the generation state of the biotechnology film in a circulation circuit is reported as explained above, a user can know a contamination degree easily and can avoid bathing to **** by which contamination was carried out by taking cures, such as exchange of ****. Moreover, exchange of unnecessary **** is lost and **** can be used effectively.

[0056] It can report contamination level to the user under bathing while an equivalence biotechnology film formation state can measure the **** purge concerning the claim 2 of this invention simple by detecting and analyzing the magnitude of attenuation

of the light in the light-receiving section using the luminescence section prepared in the circulation circuit wall as a biotechnology film detection means, and the light-receiving section which is prepared in a circulation circuit wall and receives the light from the luminescence section.

[0057] The suspended solid contained in water in the case of circulation of a biotechnology film detection means carries out precipitation adhesion, and the **** purge concerning the claim 3 of this invention is preparing between the bathtub which a biotechnology film's tends to form, and the suction side of a circulation means, and becomes detectable [the biotechnology film in a circulation circuit] corresponding to formation of an early biotechnology film. Therefore, a user can be notified before the whole inside of a circulation circuit is covered with a biotechnology film.

[0058] Since a closed circulation circuit is constituted when a biotechnology film is detected by the biotechnology film detection means, and the inside of a closed circulation circuit circulates through the **** purge concerning the claim 4 of this invention at a predetermined-time elevated temperature by the heating means, while exfoliating the biotechnology film formed in the closed circulation circuit, the bacteria containing a disease germ is annihilated by heat. Therefore, it becomes possible to prevent the contamination in a closed circulation circuit.

[0059] Even if the biotechnology film with which the cadaver of the bacteria containing the exfoliative disease germ was contained is discharged outside and the **** purge concerning the claim 5 of this invention performs purification operation again in order to drain it outside after circulating predetermined-time high temperature hot water in a closed circulation circuit, it is not returned to a bathtub. Therefore, not to mention **** becoming muddy, the organic substance used as the nutrient of the bacteria as the whole bath drainage system decreases in number, and bacterial propagation can be reduced.

[0060] The **** purge concerning the claim 6 of this invention drains high temperature hot water, performing filtering-medium washing of a purification means, since the back wash means of a purification means is made to serve a double purpose as a drainage means. Therefore, while being able to aim at effective use of ****, the blinding of a purification means is prevented and good decontamination capacity can be maintained over a long period of time. Moreover, the special drainage member for drainage becomes unnecessary.

[0061] The **** purge concerning the claim 7 of this invention is annihilated by heat, and is discarded outside while the biotechnology film containing the bacteria formed in the circulation circuit exfoliates, in order to drain outside, carrying out predetermined-time supply of the high temperature hot water from a hot-water supply means into a circulation circuit based on a biotechnology film detection result. Therefore, since it has a hot-water supply means while being able to prevent the contamination in a circulation circuit, high temperature hot water is obtained for a short time.

[0062] Since the **** purge concerning the claim 8 of this invention performs operation which detects a biotechnology film at the outside of a bathing time zone, and lets high temperature hot water flow for the inside of a closed circulation circuit in a circulation circuit by elevated-temperature circulation or the hot-water supply means by timer means to set up a bathing setup-time band, a bathing time zone can always perform bath water purification. Therefore, clear **** is secured in a bathing time zone always.

[0063] Since the inside of the purification circulation circuit which a washing medium is supplied from a washing medium supply means, and includes a bathtub and a purification means is washed, the **** purge concerning the claim 9 of this invention can save the time and effort which cleans a bathtub artificially. Moreover, the biotechnology film generated by the purification circulation circuit can be removed, and the contamination of ****, i.e., the bacterial infection to a human body, can be prevented.

[0064] If the number of times of biotechnology film detection becomes by the number-of-times Records Department of detection more than the number of times of predetermined, the **** purge concerning the claim 10 of this invention supplies a washing medium, will perform circulation purification operation, and since it will perform washing and the sterilization of a circulation circuit by the elevated temperature if it is below the number of times of predetermined, it can plan water saving by the **** contamination prevention by washing and sterilization of a circulation circuit, i.e., the bacterial-infection prevention to a human body, and the number-of-times reduction of washing using

[Translation done.]